

REMARKS/ARGUMENTS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 1-11, 13-18, and 20-23 are pending in this application. Claims 1, 4, 13, 16, and 22 are amended by the present amendment without adding new matter.

In the outstanding Office Action, Claim 4 was objected to; Claims 22 and 23 were rejected under 35 U.S.C § 102(b) as anticipated by Gravisse et al. (U.S. Patent No. 4,211,813, herein "Gravisse"); Claims 1 and 10 were rejected under 35 U.S.C § 103(a) as unpatentable over Arakawa et al. (Japanese Patent Publication No. 08-252305, herein "Arakawa"); Claims 1-9, 11-19, and 21 were rejected under 35 U.S.C § 103(a) as unpatentable over Murasawa et al. (U.S. Patent No. 5,547,823, herein "Murasawa"); and Claim 20 was rejected under 35 U.S.C § 103(a) as unpatentable over Murasawa in view of Oosawa et al. (Japanese Patent Publication No. 08-269391, herein "Oosawa").

Applicants thank Examiners Boyd and Ruddock for the courtesy of an interview extended to Applicants' representative on March 24, 2004. During the interview differences between the claims and the applied art were discussed. Further, claim amendments clarifying the claims over the applied art were discussed. The present response sets forth those discussed claim amendments. Examiner Boyd indicated she would further review the amended claims in view of a filed response.

Regarding the objection to Claim 4, Claim 4 has been amended to further limit independent Claim 1, as suggested in the outstanding Office Action. Accordingly, it is respectfully submitted that this objection be withdrawn.

Independent Claims 1, 13, and 22 have been amended to recite that the photocatalytic coating material coats fibers in a portion of a fibrous material over a thickness of between 30 and 50 nm, which is equal to a mean size of crystallites of a titanium oxide partly crystallized

in anatase form. The claim amendments find support in the specification, for example, at page 10, lines 16-21, page 14, lines 29-36, and page 15, lines 23-26.

Applicants note that a mean size of the crystallites of the titanium oxide partly crystallized in anatase form is in the range of 20 to 80 nm¹ and the thickness of the coating material recited by independent Claims 1 and 13 is in a range between 30 and 50 nm. In view of the disclosure at page 10, lines 16-21, that a preferred thickness of the coating material takes into account the mean size of crystallites of the titanium oxide partly crystallized in anatase form, and based on the above noted ranges of the mean size of the crystallites of the partly crystallized titanium oxide and the thickness of the coating material, it is believed that the present claim amendments are supported by the specification.

Claims 22 and 23 were rejected under 35 U.S.C § 102(b) as anticipated by Gravisse. That rejection is respectfully traversed.

Briefly recapitulating, independent Claim 22 is directed to a substrate including a fibrous material and photocatalytic coating material. The photocatalytic coating material coats at least a portion of the fibrous material and includes a photocatalytic semi-conducting material and an adhesion promoter. The photocatalytic coating material has a thickness of between 30 and 50 nm, which is equal to a mean size of crystallites of a partly crystallized titanium oxide in anatase form.

The claimed substrate advantageously achieves a maximum effectiveness of the coating because the thickness with which the fibers are coated is equal to a mean size of the crystallites of the partly crystallized titanium oxide.²

Turning to the applied art, Gravisse discloses a sheet material and a coating including a synthetic resin admixed with a photoluminescent complex.³ However, as discussed during

¹ Specification, page 14, lines 8-16.

² Specification, page 10, lines 16-21.

³ Gravisse, see Abstract.

the interview, Gravisse does not teach or suggest that a photocatalytic coating material coats fibers in a portion of a fibrous material over a thickness of between 30 and 50 nm, which is equal to a mean size of crystallites of a partly crystallized titanium oxide in anatase form, as required in independent Claim 22.

Accordingly, it is respectfully submitted that independent Claim 22 and dependent Claim 23 patentably distinguish over Gravisse.

Claims 1 and 10 were rejected under 35 U.S.C § 103(a) as unpatentable over Arakawa. That rejection is respectfully traversed.

Arawaka shows in Figure 1 a fibrous material 11 coated with a material including polytetrafluoroethylene fine particles 13 and photocatalyst fine particles 14. However, Arakawa shows in Figure 1 that the coating material including particles 13 and 14 has a thickness equal to at least three times a mean size of the particles 13 or 14. In addition, Arakawa is silent whether the particles 13 and 14 are partly crystallized. Therefore, as discussed during the interview, Arakawa does not teach or suggest (i) at least partly crystallized titanium oxide in anatase form in a photocatalytic coating material, and (ii) the photocatalytic coating material having a thickness of between 30 and 50 nm, which is equal to a mean size of crystallites of the at least partly crystallized titanium oxide in anatase form, as requested in amended independent Claim 1.

In addition, Applicants respectfully submit that one of ordinary skill in the art would not have coated the fibrous material with a photocatalytic coating material having a thickness as claimed in independent Claims 1, 13, and 22, because, for example, Arakawa suggests a thick coating layer having polytetrafluoroethylene fine particles 13 that are of a size that is contrary to the claimed invention. In other words, one of ordinary skill in the art would use thicker coating layers based on the art of record, contrary to the claimed invention that uses thinner coating layers.

Accordingly it is respectfully submitted that independent Claim 1 and each of the claims depending therefrom patentably distinguish over Arakawa.

Claims 1-9, 11-19, and 21 were rejected under 35 U.S.C § 103(a) as unpatentable over Murasawa. That rejection is respectfully traversed.

Murasawa discloses a fibrous material having particles such as titanium oxide in anatase form adhered to the fibrous material.⁴ The outstanding Office Action recognizes at page 6, last paragraph, that Murasawa does not teach or suggest a specific thickness of the photocatalytic coating material. The outstanding Office Action asserts that it would be obvious for one of ordinary skill in the art to optimize thickness to increase thickness for better results. However, as discussed during the interview, the present independent claims are directed to a thickness of a coating layer being equal to a mean size of crystallites of the partly crystallized titanium oxide in anatase form and nothing in Murasawa suggests this to be a desired thickness to be obtained for any reason. Note In re Antonie, 195 USPQ 6, 8-9 (CCPA 1977) and that it is impossible here to recognize any importance as to the claimed thickness being a mean size of crystallites of the partly crystallized titanium oxide in anatase form from anything taught or suggested by Murasawa. Thus, since recognition of this functionality is lacking, there is no suggestion of conducting any experimentation that could lead to this limitation.

Accordingly, it is respectfully submitted that independent Claims 1 and 13 and each of the claims depending therefrom patentably distinguish over Murasawa.

Claim 20 was rejected under 35 U.S.C § 103(a) as unpatentable over Murasawa in view of Oosawa. That rejection is respectfully traversed.

The outstanding Office Action relies on Oosawa for teaching a coating composition having an organic metallic complex. However, Oosawa does not overcome the deficiencies

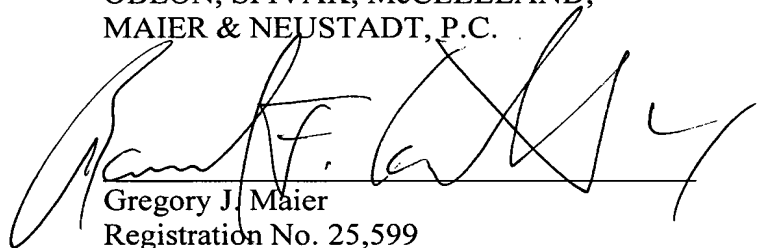
⁴ Murasawa, see Abstract.

of Murasawa as discussed above. In addition, Claim 20 depends directly on independent Claim 1, which is believed to be allowable as noted above. Accordingly, it is respectfully submitted that dependent Claim 20 is also allowable.

Consequently, in light of the above discussion and in view of the present amendment, the present application is believed to be in condition for allowance and an early and favorable action to that effect is respectfully requested.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.

A handwritten signature in black ink, appearing to read 'Gregory J. Maier', is written over a horizontal line.

Gregory J. Maier
Registration No. 25,599
Raymond F. Cardillo, Jr.
Registration No. 40,440
Attorneys of Record

Customer Number

22850

Tel: (703) 413-3000
Fax: (703) 413 -2220
GJM/RFC/RFF:sjh
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